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The Exotic Aphids (Homoptera: Drepanosiphidae) on Ornamental Birch in Northern California

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Abstract.—Five introduced species of aphids occur on ornamental birch trees in northern California. A key to these aphids is provided along with species diagnoses and biological notes.

In northern California, five species of aphids of the Family Drepanosiphidae, Tribe Phyllaphidina (sensu Heie 1980) feed on introduced trees of the genus *Betula,* the birches. The most common birch in northern California is the ornamental European white birch, *Betula pendula* Roth. The downy birch, *Betula pubescens* Ehrhart, has also been planted but much less frequently (Hajek 1986). These host trees and their aphid fauna are endemic to Europe where a guild of eleven birch aphid species occur sympatrically (Heie 1972). These introduced species of birch aphids have only recently been studied in California (Grushkowitz 1976; Hajek 1984), although they frequently create an urban pest problem due to production of copious amounts of honeydew. Dates of introduction for these species are not known although one species, *Callipterinella minutissima* (Stroyan), was only recently recorded from North America (Hajek 1985).

Apterous and alate viviparae of all five species can often be distinguished with the naked eye. The only English language keys presently available for identification of these birch aphid species include the entire European fauna of the aphid family including these species (Stroyan 1977; Heie 1982). For ease in future studies of this birch aphid fauna in California, a key to apterous and alate viviparae of these five aphid species is presented.

KEY TO BIRCH APHIDS IN NORTHERN CALIFORNIA

1	Apterous (wingless) viviparous females.	2
	Alate (winged) viviparous females.	5
2(1)	Dorsum with blackish banding.	3
	Dorsum not conspicuously blackish banded. If bands present, they are pale and indistinct.	4
3(2)	Dark banding only on abdominal tergite VIII. Very small, plump, oval, greenish aphids (body length 0.9–1.4 mm). Short, 5-segmented antennae.	
		Callipterinella minutissima (Stroyan)

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Dorsum with regular blackish banding on all abdominal segments. Color variable from green to red. Body length 1.6–2.5 mm. Antennae 6-jointed.

Callipterinella calliptera (Hartig)

4(2) Cauda broadly triangular (Fig. 1). Small (1.5–2.0 mm), rather flat, oval aphids. Frons with six capitate hairs placed on 4 tubercles. Apices of antennae dark.

Betulaphis brevipilosa Börner

Cauda slightly to distinctly constricted (Fig. 2). Delicately built aphids with long, thin legs. Body length 1.9–2.7 mm. Frons lacking capitate hairs on tubercles. Antennae pale with dark apices of segments.

Calaphis flava Mordvilko

5(1) Large aphids (body length >3 mm). Pale green, thorax with brown coloration. Abdomen sometimes with short, dark cross bars on tergite IV and/or V. Sometimes covered with flocculent white or bluish-white wax.

Euceraphis betulae (Koch)

Body length <3 mm. 6

6(5) Cauda broadly triangular (Fig. 1). Dorsum with very short, almost invisible hairs; margins of posterior segments glabrous. Abdomen usually with dark spot on tergites III-V (-VI) and dark marginal markings.

Betulaphis brevipilosa Börner

Cauda slightly constricted or knobbed (Fig. 2). Dorsum with distinct, visible hairs. 7

7(6) Frons concave (Fig. 3). Siphunculi with a thickened flared apex (Fig. 5).

Calaphis flava Mordvilko

Frons almost straight (Fig. 4). Siphunculi without flared apex (Fig. 6). 8

8(7) Processus terminalis about 1.75 or more times as long as basal part of antennal segment VI (Fig. 7). Abdomen sometimes with dark, dorsal cross [bars]. Body length 1.5–2.4 mm.

Callipterinella calliptera (Hartig)

Processus terminalis about 1.25–1.50 times as long as basal part of antennal segment VI (Fig. 8). Abdomen without dorsal cross bars. Body length 1.5–1.9 mm.

Callipterinella minutissima (Stroyan)

Treatments of Species

Betulaphis brevipilosa Börner

Apterous viviparous female.—Small (body length 1.5–2.0 mm), rather flat oval, grass- or lime-green aphids. Abdominal cuticle usually wrinkled. Abdomen with very short hairs except for marginal hairs on segments (IV-) V–VIII. Frons with 6 capitate hairs on four tubercles. Tarsi and apices of antennae dark. Siphunculi low, truncate. Cauda broadly triangular.

Alate viviparous female.—Abdomen usually grass-green or yellowish with dark spot on tergites III–V (-VI) and dark marginal sclerites. Hairs on frons fine and acute. Siphunculi sometimes dark.

Eggs.—Black, ellipsoid and without distinguishing markings. Length: $\bar{x} = 0.516$ mm ($s_{\bar{x}} = 0.007$, $n = 20$); Width: $\bar{x} = 0.258$ mm ($s_{\bar{x}} = 0.005$, $n = 20$).

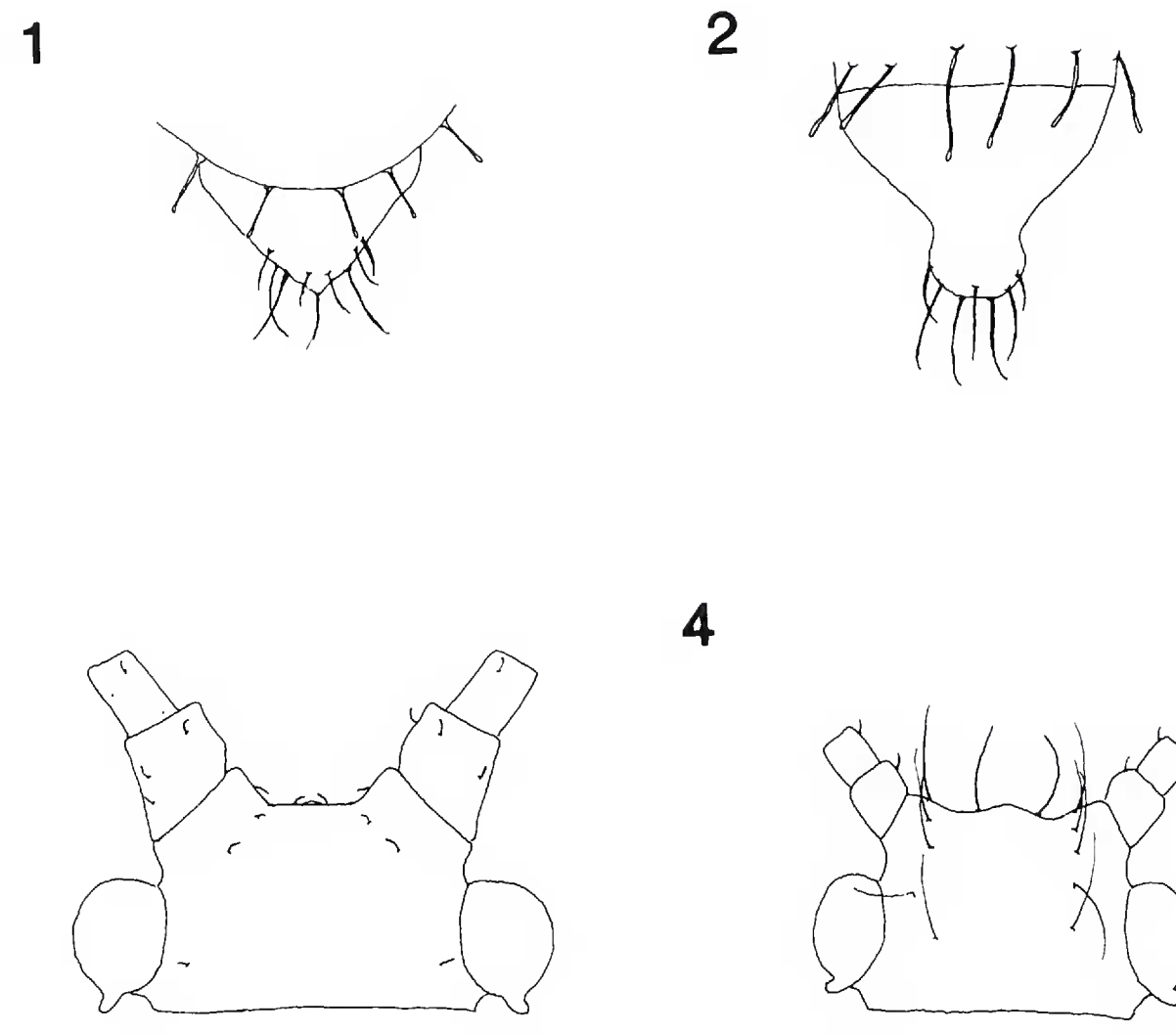

Figure 1. *Betulaphis brevipilosa*. 2, 3, 5. *Calaphis flava*. *4, 6, 7. Callipterinella calliptera*. 8. *Callipterinella minutissima*. 9. *Euceraphis betulae*. 1, 2. cauda. 3, 4. head. 5, 6. siphunculus. 7, 8. processus terminalis. 9. antennal segment III.

Biology.—Common on *B. pendula*. Avoids new leaves in spring. Dense aggregations are frequent. Extremely sessile aphid. Not ant tended.

Calaphis flava Mordvilko

Apterous viviparous female.—Pale green or yellowish, delicately built aphids with long, thin legs. Body length 1.9–2.7 mm. Hairs on dorsum long and capitate. Frons

concave. Antennae a little longer than body. Apices of antennal segments dark. Legs pale with knees, apices of tibiae and tarsi dark. Pale siphunculi low and truncate with thickened, flared apices. Cauda slightly constricted.

Alate viviparous female.—Pale green or yellowish. Hairs on dorsum short and blunt. Wing veins strong and black bordered.

Biology.—Uncommon. Populations occur predominantly on *B. pubescens*. Developing leaves are preferred in spring. Not ant tended.

Callipterinella calliptera (Hartig)

Apterous viviparous female.—Green to red with blackish dorsal cross bars on all abdominal segments. Body length 1.6–2.5 mm. Eyes red. Antennae pale with apices of segments dark. Siphunculi and legs dark. Cauda slightly constricted, knobbed.

Alate viviparous female.—Abdomen sometimes with dark dorsal cross bars. Processus terminalis 1.75 or more times the length of the basal part of antennal segment VI.

Eggs.—Black, taper toward one end, meso-dorsal suture quite evident. Length: $\bar{x} = 0.524$ mm ($s_{\bar{x}} = 0.006$, $n = 20$); Width: $\bar{x} = 0.243$ mm ($s_{\bar{x}} = 0.005$, $n = 20$).

Biology.—Common, predominantly found on *B. pendula*. In spring, developing leaves preferred. Throughout the year, found in leaves tied together by insects, e.g., spiders or Lepidoptera larvae. Often found in aggregations of many individuals which are ant tended. Fairly mobile aphid, running when disturbed.

Callipterinella minutissima (Stroyan)

Apterous viviparous female.—Very small (body length 0.9–1.4 mm), plump, oval aphids. Greenish with one dark dorsal band on abdominal tergite VIII. Vertex with a large dark sclerite. Short, 5-segmented antennae. Apical antennal segments usually dark. Siphunculi shorter than wide. Cauda slightly constricted, knobbed. White tuft of wax present below cauda.

Alate viviparous female.—Abdomen greenish. Apices of antennae, tibiae and whole tarsi dark. Antennae 6-segmented. Processus terminalis 1.25–1.50 times as long as basal part of antennal segment VI.

Biology.—Localized populations present inside of female catkins throughout the summer. On leaves during early spring and fall, preferring leaves spun together by insects. Usually aggregated when found on leaves. Not ant tended.

Euceraphis betulae (Koch)

Viviparous female.—All viviparous females alate. Large aphids (3.0–3.6 mm long), elongate, pale green. Body sometimes clothed in flocculent white or bluish-white wax. Head with dark dorsal spot or longitudinal stripe. Prothorax with two brown spots, meso- and metathorax brown. Abdomen sometimes with short, dark cross bars on segments IV–V or IV only. Antennae as long as body. Basal parts of antennal segments III and IV dark in some specimens from spring and autumn. Antennal segment III with 14–26 characteristic narrow transverse oval rhinaria almost in a line (Fig. 9). Long legs sometimes with darkened tarsi and distal ends of tibiae. Siphunculi about 0.03 times body length, truncate, sometimes dark. Cauda knobbed.

Eggs.—Black, ellipsoid, and without distinguishing markings. Length: $\bar{x} = 0.802$ mm ($s_{\bar{x}} = 0.008$, $n = 20$); Width: $\bar{x} = 0.394$ mm ($s_{\bar{x}} = 0.007$, $n = 20$).

Biology.—Common on *B. pendula.* Prefers new, developing leaves in spring and senescent leaves in early autumn. Forms loose aggregations usually of few individuals. Highly mobile aphid which runs or drops from leaves readily. Not ant tended.

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